

Fuel Guidance - CG In-Line Fuel Sampling Program

(Continued from the Fall 2000 Edition)

By Tom Gahs

In partnership with the US Navy and the Defense Energy Support Center (DESC), the Coast Guard is participating in an In-line Fuel Quality Sampling Program. The data is being used to:

- 1) Establish the overall quality of commercial fuel products;
- 2) Confirm bunker quality contract compliance for Naval Purchase Description Marine Gas Oil (NPD MGO), DF2, or B76 products;
- 3) Check fuel quality (for information only) against critical F-76 MIL-SPEC criteria that aren't included as bunker contract requirements;
- 4) Assess quality for each load of fuel, as actually delivered from the supplier, and provide participating cutters with specific operational advice when a fuel load doesn't meet expected quality standards;
- 5) Build a fuel quality database so cutters can anticipate fuel quality for a given port of call, and avoid suppliers of poor quality fuel.

Twenty cutters are currently participating in the program. Only commercial fuel products are sampled and analyzed, whether the fuel is obtained through DESC bunker contractors (NPD MGO, DF2, or B76), or on the open market. MIL-SPEC fuel products (F-76 or JP5) are not sampled because these products have their own extensive quality assurance programs.

Fuel samples are taken at the deck manifold connection using a special sampling flange. The sampling flange provides a continuous drip sample throughout the fueling period, and across the entire cross section of the fuel manifold, to ensure the sample is representative of the whole fuel load. Five 1-liter samples from each fueling are forwarded by express courier to the contracted lab. Compliance with the NPD contract requirements is reported within one business day of the samples' receipt. Results for the full F-76 results takes a few days longer. The results are interpreted by ELC and forwarded to the cutter via Naval message. ELC also provides operational guidance if the fuel didn't meet quality expectations. If a bunkers contract requirement wasn't met, ELC initiates the formal Customer Complaint process with DESC. We've seen several cases where DESC bunker contractors have improved the quality of their product as a result of this process. The results are also entered into a fuel quality database. The database is updated quarterly and can be accessed from any CG Work Station III at <http://cgweb.elcbalt.uscg.mil/docs/Fueltest/fueltest.htm>. The cost of the analysis, shipping, and consumable supplies are paid by the program.

A summary of results (as of October 2000) follows:

- The quality of commercial fuel products, including NPD MGO, is far better than originally anticipated; 57% of the tested samples fully meet the NPD requirements.
 - 29% failed because of high **Cloud Point** temperatures. Cloud Point is the cold temperature at which wax crystals first form in the fuel and could therefore become a filter clogging problem.
 - 11% failed due to **Appearance** (either **Clear & Bright** or **Color**). Typically a sample failed because of haze, or because it was dyed green (from the Caribbean). Only red colored dye is allowed by the NPD.
- 30% of the samples met the full F-76 criteria.
 - Of the samples that did not meet the full F-76 criteria, 45% failed the **Storage Stability** criteria. Storage stability refers to the long term (3 years) oxidation stability of the fuel. When a fuel becomes unstable, it forms oxygenated particulates that cause rapid filter clogging. If the particles should get past the filters, serious engine damage could occur. Failure to pass the F-76 criteria doesn't necessarily mean that the fuel was currently unstable, only that it would not have remained stable for the entire 3 year period. To date, no cutter who is participating in the program has actually experienced a shipboard storage stability problem.
- The worst quality fuel is generally found in the Caribbean.

The CG's In-Line Fuel Sampling Program has proven to be extremely beneficial for fuel quality personnel at DESC, Navy and the CG, but also for the participating cutters. Current plans call for gradual expansion of the program to include all WHECs, WMECs, and WAGBs. Five more cutters will be added to the program in FY01.

Any questions concerning the CG's In-Line Fuel Sampling Program should be directed Tom Gahs, ELC-026, voice 410-762-6291, fax 410-762-6203, email TGahs@elcbalt.uscg.mil. The next issue will focus on NPD MGO fuel characteristics.